

Amendments to the Specification

Please replace the paragraph beginning on page 4, line 20, with the following rewritten paragraph:

The electrically conductive grid is preferably made of copper or it is constituted by a diaphragm made of perforated electrical insulating material, for example ~~kapton~~ KAPTON[®], which is a kind of ~~polyimide~~ polyimide, while this diaphragm is fitted with the first conducting coating on the side near to the sensor and with the second conducting coating applied to its reverse side, where the first conducting coating is electrically isolated from the second conducting coating.

Please replace the paragraph beginning at page 5, line 10, with the following rewritten paragraph:

The invention will be described in detail according to the enclosed drawings, where

Fig. 1 shows the preferred embodiment of the secondary electron detector fitted with the ~~kapton~~ KAPTON[®] diaphragm according to the present invention, in the specimen chamber of the electron microscope[.];

Fig. 2 shows another preferred embodiment of the secondary electron detector with a copper grid, according to the present invention, also in the specimen chamber of the electron microscope[.];

Fig. 3 shows the sectional view of the ~~kapton~~ KAPTON[®] diaphragm used in the first exemplified embodiment of the detector according to this invention; and

Fig. 4 shows a preferred embodiment of the secondary electron detector with a metallic disk, according to the present invention, also in the specimen chamber of the electron microscope.

Please replace the paragraph beginning at page 5, line 22, with the following rewritten paragraph:

Fig. 1 shows the first exemplified embodiment of the secondary electron detector according to the present invention. The secondary electrons detector 1 consists of the sensor 2 located in the chamber 3 of the detector. The sensor 2 consists of the light guide 4 to whose

output 5 the photo-multiplier (~~not shown~~) 32 is connected and to whose output 6 the scintillator 7 is connected, whose surface is coated, while to the active surface or coating 8 of the scintillator 7 the high voltage source 9 is connected. To the detector chamber 3 vacuum air pump 10 is connected to create vacuum inside the detector chamber 3. The wall 40 of the detector chamber 3 near to the scintillator 7 is enclosed by an electrically conductive grid 11 constructed from diaphragm 12, in the given embodiment of ~~kapton~~ KAPTON[®], with orifices 13 and fitted on both sides with conducting coatings 14 and 15. The configuration of ~~kapton~~ KAPTON[®] diaphragm 12 is shown in detail in Fig. 3. To both conducting coatings 14, 15 voltage sources 16, 17 are connected. To the first conducting coating 14 near to sensor 2 the source 16 of a voltage of 250 V is connected and to the second conducting coating 15 far from sensor 2 the source 17 of a voltage of 500 V is connected. The electrically conductive grid 11 is covered outside the detector chamber 3 with hemispherical input grid 18, which is connected to source 19 of low voltage of 80 to 150 V. Light guide 4 has its output 5 situated outside the detector chamber 3 and its passage through the wall 42 of the detector chamber 3 is vacuum tight. The detector chamber 3 is located in the specimen chamber 20 of the electron microscope. Front panel 3 of the secondary electrons detector 1 fitted with hemispherical input grid 18 is near to the specimen 21 in the specimen chamber 20.

Please replace the following paragraph beginning at page 6, line 10 with the following rewritten paragraph:

The secondary electrons detector 1 in the first exemplified embodiment works as follows: The electron beam 22 accelerated in the electron microscope strikes the surface of specimen 21 and the impinging electrons cause the emission of the secondary electrons from the surface of specimen 21, the energy of the emitted secondary electrons being only a few electronvolts, while the back-scattered electrons have the energy of several kiloelectronvolts. The back-scattered electrons are scattered to different directions and only a negligible number of them have the chance of passing through orifices 13 in ~~kapton~~ KAPTON[®] diaphragm 12, as the electric field of the hemispherical input grid 18, to which a potential of 80 V is applied, has itself a negligible energy by comparison with the energy of the back-scattered electrons. By contrast with this, the secondary electrons, in view of their low proper energy, are strongly attracted by the electric field of the hemispherical grid 18. Due to the gaseous atmosphere in the electron microscope

specimen chamber 20, the electrons collide in course of their movement with the gas molecules and thus further secondary electrons are created and thus the effect is multiplied. In the area under the hemispherical input grid 18 an electric field is produced by the 250 V voltage on the first conducting coating 14. This electric field creates electrostatic micro lenses 30 at the holes in the hemispherical input grid 18 and it is transmitted through the holes outside the hemispherical input grid 18. The secondary electrons reaching the surface of the hemispherical input grid 18 thus do not generally impinge on the hemispherical input grid 18, but pass through the holes in the grid to the compartment between the hemispherical input grid 18 and kapton KAPTON[®] diaphragm 12. They are reattracted in this space by 250 V voltage on the kapton KAPTON[®] diaphragm 12. Nevertheless, the second conducting coating 15 has a voltage of 500 V and thus in orifices 13 analogous electrostatic lenses are created and the secondary electrons reaching the surface of kapton KAPTON[®] diaphragm 12 mostly do not strike the first conducting surface 14 but pass through orifices 13 into the detector chamber 3. In this detector chamber 3, they are entrained by the electric field of the coating 8 of the scintillator 7. As it is known in the art, due to the voltage of 10 kV on the coating 8 of the scintillator 7, the secondary electrons pass through the coating 8 and strike the scintillator 7 with an energy of approximately 10 keV. The scintillations produced by the secondary electrons striking scintillator 7 are then transmitted through the light guide 4 to the ~~photo-multiplier input~~ 34 of the photomultiplier 32, on whose output a signal appears, whose value is in proportion to the number of secondary electrons emitted from the surface of the specimen 21.

Please replace the paragraph beginning on page 7, line 11 with the following rewritten paragraph:

In experiments carried out with this arrangement, the kapton KAPTON[®] diaphragm 12 was used. It was made of a kapton KAPTON[®] foil 0.125 mm thick plated on both sides with aluminum and subsequently holes were drilled into it of a diameter of 0.15 mm in a square matrix of 10 x 10 holes with a spacing of 0.5 mm. The pressure in the detector chamber 3 was established by the vacuum air pump 10 to a value of less than 7 Pa. With this arrangement, a satisfactory image was attained even with a primary beam current in the order of tens of pA.

Please replace the paragraph beginning on page 7, line 18 with the following rewritten paragraph:

Fig. 2 shows the second exemplified embodiment of the secondary electron detector according to the present invention. This embodiment differs from the first exemplified embodiment by the fact that a copper grid was used in place of the electrically conductive grid 11. In this embodiment, the system of micro lenses 30 on the electrically conductive grid 11 is omitted that was introduced by the different charges of the two coatings of the ~~kapton~~ KAPTON® diaphragm 12, nevertheless, the electrically conductive grid 11 is located in a strong field of electric voltage of 10 kV on the coating 8 of the scintillator 7, so that a system of micro lenses 30 is also created on the electrically conductive grid 11, which entrains the secondary electrons into the orifices 13 made in the electrically conductive grid 11 and further on to the scintillator 7. In view of the technological difficulties related to the production of the ~~kapton~~ KAPTON® diaphragm 12 with the orifices 13, where the ~~kapton~~ KAPTON® diaphragm 12 must be coated on both sides and the inner walls of the orifices 13 must retain their nonconductive surface, current ~~kapton~~ KAPTON® diaphragms 12 compared to the current copper grids have a much smaller ratio of the area of orifices 13 to the area of the grid material. Thus, due to the current technology of manufacturing the ~~kapton~~ KAPTON® diaphragms 12, the current copper grids achieve a signal by one order higher than the ~~kapton~~ KAPTON® diaphragms 12.

Please replace the paragraph beginning on page 8, line 28 with the following rewritten paragraph:

In experiments with the arrangements according to the present invention, a standard copper grid used as a specimen holder in the transmission electron microscopy was applied as electrically conductive grid 11. The active surface of the grid was approx. 2 mm in diameter and it contained approximately 160 orifices of 0.1 mm in diameter. Compared with the ~~kapton~~ KAPTON® diaphragm 12 applied in the preceding embodiment, the area of the orifices was comparable, nevertheless, the orifices were concentrated on a ten times smaller area. A voltage of 400 to 500 V was applied to the grid 11. In this arrangement, a signal approximately ten times stronger was attained than in the case in which the ~~kapton~~ KAPTON® diaphragm 12 was applied

and it appears to be the most effective state-of-the-art arrangement, with the added advantage of avoiding the technologically demanding production of the ~~kapton~~ KAPTON[®] diaphragms 12.